INDEX TO VOL. XLVII.

A.

American Gas Institute, Report of Special Committee, Western Association 6
Amending the By-Laws, Western Association 29
Ammoniacal Liquor as a Manure 73
Artesian and Gas Wells 74
Accident, a Remarkable 137
Antiseptics, the Use of in Preserving Railroad Ties and Timber 166
Alternating Currents, Distributing by 169
*Alvoine's Plan of Hydraulic Mains Used in the Dijon Gas Works 233
Advice to Gas Consumers 259
Association of Gas Managers, the North of Ireland 259
Amending Art. IV. of Constitution, American Association 266
Address of President Greenough, American Association 276

B.

Breeze and Coke as Boiler Fuels 137
Blythe, T., Regenerative Retort Firing System for Small Gas Works 168
Bindings of Books, Effect of Gas on the 259
Baltimore Gas War, End of the 284
*Blodget, C. W., on the Comparative Illuminating Power of Gas Purified with Lime vs. Oxide of Iron 320
Bredel, F., on the Advantages of Regenerative Furnaces for Large and small Gas Works 324
British Columbia, the Gas Works of 386

C.

*Cholar, B. E., on the Rule of the Inverse Squares 7; Candle Power and Castigation 354
Cement from Blast Furnace Slag 13
Cosgrove T. A., on the Lungren Burner 68
Committee on Place of Meeting, Western Association, Report of 38
Coal Tar, Uses for 66
Committee of Arrangements, Western Association 73
Coke Market, the English 73
Creosoted Brick for Street Pavements 74
Chimneys, How to Protect Tall from Lightning Strokes 78
Coke in Russia 78
*Coke, a Paper by Chas. Gandon 90
Coke as a General Fuel, by C. E. Jones 101
Coke and Breeze as Boiler Fuels 137
Coal Oil Lamps, Dr. Flock's Experiments on 138
Coal Gas, the Manufacture of, an Abstract of Four Lectures by Lewis T. Wright 195
Compressed Air as a Motive Power 200
Coal Washer, the Marsault 205
Carbonic Acid, Effect of upon the Illuminating Power of Coal Gas, by Jno. T. Sheard 227
Carbonic Acid, Effect of on the Illuminating Power of Coal Gas, by C. W. Hinman 258
Coal Gas Basis, A 259
Claus' Process of Purification 259
Coke Scrubbers, New Filling for 259
Constitution, Draft of a New, as Recommended by Executive Committee of American Association 274
Clark, Walton, on Water Gas 289
Committee on President's Address, American Association, Report of 289
Complaints 285
Chicago (Ills.), Shall it Have a Municipal Gas Works? 306
Committee of Arrangements, '88 Meeting of American Association 350
Candle Power of Gas, Disadvantages of Fluctuations in that Supplied to Consumers, by R. J. Monks 323
Coke, the Use and Value of for Generating Steam, by J. L. Hallett 326
Committee of Investigation, Appointment of, American Association 327
Combustion 333
*Crompton's Shadowless Arc Light Pole 334
Candle Power and Castigation 354
Cheap Gas in England 361
Cement Mortar, the Effects of Freezing on, by A. Noble 390
Cincinnati (Ohio), Results of the Lighting Test at the Grand Central Railway Depot 392
Conservation of Energy 397
Correspondence, Special English 9, 73, 137, 200, 259, 361

CORRESPONDENCE—
- Flow from a Natural Gas Well, How Should it it be Determined? 77
- Information on Leakage Percentages Allowable, Seeking for 77
- Meters, State of, a Simple Plan for Showing to Consumers 205
- Tar Pavements, How to Make 257

D.

Dunbar, J. W., on Furnishing Gas without a Holder 37
District of Columbia, Regulating the Storage of Inflammable Substances in 41
*Damper Frame for Furnaces, Humphrys' Patent 105
Dynamos Driven with Short Belts 104
Dynamo, the Pyro-Magnetic, Summary of a Paper, by T. A. Edison 136
Dynamos, Regulating the Speed of Engines for Driving 141
Distribution by Alternating Currents 169
Dibdin, W. J., on Photometrical Standards 200
Dangers of Oil Lamps 232
Difficult Soldering 334
Distillation of Wood 333

E.

Electric Light and Plants 2
Electric Light, What is the Best Way to Fight It? 2
Electric Light and Plant Life 9
English Gas Exhibitions, at the 9
Election of Officers, Western Association 57
Election of Officers, American Association 284
Election of Honorary Members, Western Association 39
Election of New Members, American Association 266
Electric Light at the Suez Canal 41
European Gas Association, Meetings of the. 66
Edison, T. A., Summary of a Paper by, on a Pyro-Magnetic Dynamo 136

E.—Continued.

Engines for Driving Dynamos, Regulating the Speed of 141
English Gas Companies and Mineral Oil .. 199
Electric Lighting from Central Stations ... 231
Electricity, Gas into 257
Executive Committee, Report of, American Association 264
Executive Committee, Supplementary Report from, American Association 327
Electric Light Business, the Advantages to Gas Companies of Engaging in, by E. J. King 317
Energy, the Conservation of 397

EDITORIALS—
- American Association, the Coming Meeting of the 162
- American Gas Institute, In Regard to the Proposed 33
- "Baby Process," a Sample of Gas Made by the 34
- Books Received 306
- Chicago Gas Situation, Perplexities in the 225
- Corporate Luck, The American Gas Improvement Company 130
- Correspondence, a Self-Explanatory 353
- Dayton (Ohio) City Council, Decision of the 129
- Denniston, W. H., Personal Mention of 130
- European Gas Association Meetings, the 66
- Exeter Theater Disaster 194
- Fuel Gas Question 385
- Gas Institute, Progress in the Matter of the Proposed 98
- Harrison, F. E.—Obituary 2
- Levy's Electric Light Primer 98
- New York Meeting, the American Association's 257
- Nettleton and King Papers, the 305
- Not Quite so Glittering 385
- Putnam, C. E.—Obituary Note 162
- Progress Scored in 1887 1
- Springfield, Mass., the Outcome at 65
- Warning, the Final in Regard to the American Association Meeting 226
- Welcome Home to Mr. E. Stein 194

F.

Furnishing Gas without a Holder, by J. W. Dunbar 37
*Furnaces, Humphrys' Patent Damper Frame for 105
Forbes, G., on Electric Lighting from Central Stations 231
Fuel Gas Plant in Pittsburgh, Pa 110
Flock's (Dr.) Experiments on Coal Oil Lamps 138
Furnaces, Generator, for Small Gas Works. 141
Finance Committee, Report of, American Association 266
Fuel Gas, by Emerson McMillin 311
Furnace, Half-Depth Regenerative, Development of, by Oscar Weber 324
Furnaces, Regenerative, Advantages of for Large and Small Gas Works, by F. Bredel 325
Fog, the Cost of a Day's to Londoners 386

G.

Gas Institute, Meeting of the 9
Gas for Cooking and Heating 9
Gas Furnished without a Holder, by J. W. Dunbar 37
Gasholders, What Causes the Formation of Small Holes in the Iron of 68
Gas and Artesian Wells 74
Gas Institute, British, Papers Read at the Recent Meeting of 9., 101, 131
*Gandon, Chas., on Coke 90
Gas Coke as a General Fuel, by C. E. Jones. 101
*Gas Gauges, Richard Brothers' Standard.. 105
*Gasholders, the Guide Framing of, by W. H. Y. Webber 131
Gas Light and Coke Company, the Accounts of the 138
Generator Furnaces for Small Gas Works... 141
Gas Managers, Hints to 174
Gas Companies (English) and Mineral Oil.. 199
Gas and the Stage 201
*Gas Pipes, a Handy Machine for Piercing. 232
Gas into Electricity 257
Gas, the Effect of on the Binding of Books 259
Gas Companies and the Electric Light, Advantages to of Engaging in, by E. J. King 317
Gas, Candle Power of, the Disadvantages of Fluctuations in that Supplied to Consumers, by R. J. Monks 323
Generating Steam, the Use and Value of Coke for, by J. L. Hallett 326
Gas Interest in England, Mr. R. P. Spice on the 327
*Gas Works, Structural Capacity and Cost of, by V. Wyatt 355
Gas for the Million 362
Gas Works of British Columbia 386
Gas Tar, Utilization of 392
Grand Central Railway Depot (Cincinnati, Ohio) Results of the Lighting Test at 392

H.

Humphrys, N. H., on Some Past Projects for the Manufacture of Oil Gas 29
Honorary Members, Election of, Western Association 38
*Humphry's Patent Damper Frame for Furnaces 105
*Hydraulic Main, the Alavoine Plan of as Used in the Dijon Gas Works 233
Hinman, C. W., on the Effect of Carbonic Acid on the Illuminating Power of Coal Gas 258
*Humphreys, A. C., on "Illumination vs. Candle Power 272
Half-Depth Regenerative Furnace, etc., by O. Weber 324
Hallett, J. L., on the Use and Value of Coke for Generating Steam 326

I.

*Inverse Squares, the Rule of the, by B. E. Cholar 7
Inflammable Substances, Regulating the Storage of in Washington, D. C. 41
Institute, the British Gas, Some of the Papers Read at Last Meeting of 99, 101, 131
Ironwork, Painting 142
Illuminants, Oil and Water Gas as, by C. F. Prichard 226

I.—Continued.

Illuminating Power of Coal Gas, Effect of Carbonic Acid upon the, by J. T. Sheard 227
Irish Bog Oxide of Iron on the Determination of Hydrous and Anhydrous Peroxide of Iron in 232
Illuminating Power of Coal Gas, Effect of Carbonic Acid on, by C. W. Hinman 258
*Illumination vs. Candle Power, by A. C. Humphreys 272
Intensity of Light and Visual Perception, the Relation of, by Ed. C. Jones 275
Illuminating Power of Gas, Comparative, when Purified with Lime or Oxide of Iron, by C. W. Blodget 320
Indian Petroleum Fields 333
Items of Interest from Various Localities 10, 43, 74, 105, 138, 170, 202, 234, 265, 307, 362, 394

J.

Jubilee Rejoicings 9
Jottings from Rome, Italy, by E. Schinrock 36
Jones, C. E., on Gas Coke as a General Fuel 101
Jones, Ed. C., on the Relation of Intensity of Light and Visual Perception 275

K.

Kokomo's (Ind.) Gas Well 46
King, E. J., on the Advantages of Gas Companies Engaging in the Electric Light Business 317

L.

Lungren Burner, the, by T. A. Cosgrove 68
Leakage from Gas Mains, Detection of 73
Lightning Strokes, How to Protect Tall Chimneys from 78
Levy's Electric Light Primer 98
Lectures on Coal Gas, by Lewis T. Wright. 137
Lunge, on "Coal Tar and Ammonia," a New Edition of 201
Leavenworth, Gen. E. W., Death of 306
Lighting Test at the Grand Central Railway Depot, Cincinnati, Ohio, Results of the.... 392

M.

*Machine for Screwing and Cutting Tubes.. 41
Men in the Retort House, Considering the Policy of Working Three Shifts of in 24 Hours 73
Mains, Gas, Detection of Leakage from..... 73
Manufacture of Coal Gas, an Abstract of Four Lectures, by Lewis T. Wright..... 195
Mineral Oil and the English Gas Companies 199
Motive Power, Compressed Air as a 200
Marsault's Coal Washer 205
*Machine for Piercing Gas Pipes, a Handy. 232
Morton, H., President Takes Part in the Discussion on the Humphreys' and Jones' Papers, American Association 276
Municipal Gas Works, Shall Chicago Have a? 306
McMillin, E., on Fuel Gas 311
Meter Connections, Reports of Special Committees, American Association, on a Uniform Standard of 266, 317
Monks, R. J., on Disadvantages Occasioned by Fluctuations in Candle Power of Gas Supplied to Consumers 323
Marlboro', Mass., a Line from 334
Mortar, the Effects of Freezing on Cement.. 390
Market for Gas Securities, the 14, 45, 78, 110, 142, 174, 206, 238, 285, 334, 366, 398

N.

Natural Gas, How to Enrich 69
Nettleton, C. H., on the Utilization of Residual Products 279
Noble, A., on the Effects of Freezing on Cement Mortar 390
Notes from the West, by Retort 10, 42, 110, 130, 365

O.

Oil Gas, a Glance at Some Past Projects for the Manufacture of, by N. H. Humphrys. 29
Oxide of Iron, Purification of *in situ* 73
Ohren, M., and the Sulphur Compounds 137
Oil Lamps, Dr. Flock's Experiments on 138
Oil and Water Gas as Illuminants, by C. F. Prichard 226
Oxide of Iron, Irish Bog, on the Determination of Hydrous and Anhydrous Peroxide of Iron in 232
Oil Lamps, the Dangers of 232
*Oxide of Iron vs. Lime, Comparative Illuminating Power of Gas Purified by, C. W. Blodget 320
Oxide of Iron, Valuation of in the Purification of Gas 331

OFFICIAL NOTICES, ETC—
- American Gas Light Association 97, 161, 193, 225

OFFICIAL REPORTS—
- American Gas Light Association, XV. Annual Meeting of 263, 311
- Western Gas Association, X. Annual Meeting of (Concluded from Vol. XLVI.) 2, 34, 66

P.

Plants and the Electric Light 2
Purification of Oxide of Iron *in situ* 73
Papers Read at the Meeting of British Gas Institute 99, 101, 131
Pyro-Magnetic Dynamo, Summary of a Paper, by T. A. Edison 136
Pittsburgh, Pa., Fuel Gas Plant in 110
Painting Ironwork 142
Putnam, Chas. E., Obituary Note 162
Purification in Closed Vessels, by Wm. Young 163
Preservation of Railroad Ties and Timber by the Use of Antiseptics by J. P. Card.. 166
Peroxide of Iron in Irish Bog Ore, on the Determination of 232
Place for Next Meeting, Western Association 38
Place for Next Meeting, American Association 282
Power, Compressed Air as a Motive 200
Photometrical Standards, W. J. Dibdin on . 200
Petroleum Scare, an English 201
Prichard, C. F., on Oil and Water Gas as Illuminants 226
Petroleum in Russia 229
*Piercing Gas Pipes, a Handy Machine for. 232
President's Address, Report of Committee on, American Association 283

P.—Continued.

Printing the Papers in Advance, American Association 327
Publishing the Proceedings, American Association 328
Purification Puzzles, by Thos. Turner 321
Page, G. S., on the Market for Residual Products 282
Petroleum Fields of India 333
Purification *in situ* 361
Plainfield (N. J.) Public Lighting 386

Q.

Question-Box, Western Association 2, 66

R.

*Rule of the Inverse Squares, by B. E. Cholar 7
Rome, Italy, Jottings from, by E. Schinrock 36
Regulating the Storage of Inflammable Substances, Dist. of Columbia 41
Russia, Coke in 78
Refrigerating apparatus, Tests of 104
*Richard Brothers' Standard Gas Gauges .. 106
Remarkable Accident 137
Regulating the Speed of Engines for Driving Dynamos 141
Railroad Ties and Timber, the Preservation of by Antiseptics 166
Regenerative Retort Firing System for Small Gas Works, by T. Blythe 168
Russian Petroleum 229
Roll Call, American Association 263
Residual Products, Utilization of, by C. H. Nettleton 279
Regenerative Furnace, Development of the Half-Depth, and Some of the Results, by O. Weber 324
Regenerative Furnaces, the Advantages of for Large and Small Gas Works, by F. Bredel 324
*Regenerator Tar Furnace, by J. Somerville 387
Railroad Cars, How Shall They be Heated?. 391
Results of the Lighting Test at the Grand Central Railway Depot, Cincinnati, Ohio. 392

S.

Spectroscopical Test of Tar Colors 8
Slag, Cement from Blast Furnace 13
Spencer, R., Letter from to Western Association 39
Schinrock, E., Jottings from Rome, Italy... 38
*Screwing and Tube Cutting Machine..... 41
Suez Canal, the Electric Light at the..... 41
Société Technique de l'Industrie du Gaz en France 74
Sulphate of Ammonia, Production of in England 74
*Standard Gas Gauges, Richard Brothers'.. 106
Short Belts for Driving Dynamos 109
Speed of Engines for Driving Dynamos, Regulating the 141
*Standard Ammeter, the Waterhouse..... 199
Sheard, J. T., on the Effect of Carbonic Acid, etc 227
Sutherland, J., on the Determination of Certain Ingredients of Irish Bog Oxide of Iron 232
Secretary and Treasurer, Annual Report, American Association 263
Special Committees, Appointment of, American Association 269
Steam, the Use and Value of Coke for Generating, by J. L. Hallett 326
Spice, R. P., on the English Gas Business.. 327
Saccharin 332
Soldering, Difficult 332
*Shadowless Arc Light Pole, the Crompton. 334
*Structural Capacity and Cost of Gas Works, by V. Wyatt 355
Somerville, J., on a Regenerator Tar Furnace 387

T.

Tar Colors, Spectroscopical Test of 8
*Tube Cutting and Screwing Machine 41
Timber and Railroad Ties, Preservation of by Antiseptics 166
Told Briefly—Proposed Extension to the Washington (D. C.) Company's Plant.... 205
Trenching and Pipe Laying 306
Turner, Thos., on Three Purification Puzzles 321
Turning the Tables—the Results of an Expert Meter Tester's Work in Cincinnati, O. 360
Tar Useless for Gas Making 362
*Tar Furnace, a Regenerator, by J. Somerville 387
Tar from Gas, Utilization of 392

U.

*Utilization of Gas Tar 392

V.

Votes of Thanks, Western Association, 73; American Association 330
Visual Perception, the Relation of Intensity of Light and, by Ed. C. Jones 275
Vote of Sympathy by American Association to J. R. Thomas 331
Valuation of Oxide of Iron for the Purification of Gas, by H. L. Greville 331

W.

Watts, S., Resolution Offered in Regard to the Egner Institute Proposition, Western Association 6
Wells, Artesian and Gas 74
*Webber, W. H. Y., on the Guide Framing of Gasholders 131
Western Waifs, by Diaphragm 173, 238
Wright, Lewis T., Abstract of Four Lectures on the Manufacture of Coal Gas 195
*Waterhouse Standard Ammeter 199
Washer, Marsault's Coal 205
Water and Oil Gas as Illuminants, by C. F. Prichard 226
Wheeling, West Va., How Gas Works Officials are Selected at 261
Water Gas, by Walton Clark 269
Weber, O. B., on Development of the Half-Depth Regenerative Furnace, and Some of the Results 324
Wood, Distillation of 333

Y.

Young, Wm., on Purification in Closed Vessels, and Avoidance of Nuisance in Gas Manufacture 163

Z.

Zirconia, Valuable Deposits of 262

INDEX TO VOL. XLVII.

A.

American Gas Institute, Report of Special Committee, Western Association 6
Amending the By-Laws, Western Association 29
Ammoniacal Liquor as a Manure 73
Artesian and Gas Wells 74
Accident, a Remarkable 137
Antiseptics, the Use of in Preserving Railroad Ties and Timber 166
Alternating Currents, Distributing by 169
*Alvoine's Plan of Hydraulic Mains Used in the Dijon Gas Works 233
Advice to Gas Consumers 259
Association of Gas Managers, the North of Ireland 259
Amending Art. IV. of Constitution, American Association 266
Address of President Greenough, American Association 276

B.

Breeze and Coke as Boiler Fuels 137
Blythe, T., Regenerative Retort Firing System for Small Gas Works 168
Bindings of Books, Effect of Gas on the 259
Baltimore Gas War, End of the 284
*Blodget, C. W., on the Comparative Illuminating Power of Gas Purified with Lime vs. Oxide of Iron 320
Bredel, F., on the Advantages of Regenerative Furnaces for Large and small Gas Works 324
British Columbia, the Gas Works of 386

C.

*Cholar, B. E., on the Rule of the Inverse Squares 7; Candle Power and Castigation 354
Cement from Blast Furnace Slag 13
Cosgrove T. A., on the Lungren Burner 68
Committee on Place of Meeting, Western Association, Report of 38
Coal Tar, Uses for 66
Committee of Arrangements, Western Association 73
Coke Market, the English 73
Creosoted Brick for Street Pavements 74
Chimneys, How to Protect Tall from Lightning Strokes 78
Coke in Russia 78
*Coke, a Paper by Chas. Gandon 90
Coke as a General Fuel, by C. E. Jones 101
Coke and Breeze as Boiler Fuels 137
Coal Oil Lamps, Dr. Flock's Experiments on 138
Coal Gas, the Manufacture of, an Abstract of Four Lectures by Lewis T. Wright 195
Compressed Air as a Motive Power 200
Coal Washer, the Marsault 205
Carbonic Acid, Effect of upon the Illuminating Power of Coal Gas, by Jno. T. Sheard 227
Carbonic Acid, Effect of on the Illuminating Power of Coal Gas, by C. W. Hinman 258
Coal Gas Basis, A 259
Claus' Process of Purification 259
Coke Scrubbers, New Filling for 259
Constitution, Draft of a New, as Recommended by Executive Committee of American Association 274
Clark, Walton, on Water Gas 289
Committee on President's Address, American Association, Report of 289
Complaints 285
Chicago (Ills.), Shall it Have a Municipal Gas Works? 306
Committee of Arrangements, '88 Meeting of American Association 350
Candle Power of Gas, Disadvantages of Fluctuations in that Supplied to Consumers, by R. J. Monks 323
Coke, the Use and Value of for Generating Steam, by J. L. Hallett 326
Committee of Investigation, Appointment of, American Association 327
Combustion 333
*Crompton's Shadowless Arc Light Pole 334
Candle Power and Castigation 354
Cheap Gas in England 361
Cement Mortar, the Effects of Freezing on, by A. Noble 390
Cincinnati (Ohio), Results of the Lighting Test at the Grand Central Railway Depot 392
Conservation of Energy 397
Correspondence, Special English 9, 73, 137, 200, 259, 361

CORRESPONDENCE—
- Flow from a Natural Gas Well, How Should it it be Determined? 77
- Information on Leakage Percentages Allowable, Seeking for 77
- Meters, State of, a Simple Plan for Showing to Consumers 205
- Tar Pavements, How to Make 257

D.

Dunbar, J. W., on Furnishing Gas without a Holder 37
District of Columbia, Regulating the Storage of Inflammable Substances in 41
*Damper Frame for Furnaces, Humphrys' Patent 105
Dynamos Driven with Short Belts 104
Dynamo, the Pyro-Magnetic, Summary of a Paper, by T. A. Edison 136
Dynamos, Regulating the Speed of Engines for Driving 141
Distribution by Alternating Currents 169
Dibdin, W. J., on Photometrical Standards 200
Dangers of Oil Lamps 232
Difficult Soldering 334
Distillation of Wood 333

E.

Electric Light and Plants 2
Electric Light, What is the Best Way to Fight It? 2
Electric Light and Plant Life 9
English Gas Exhibitions, at the 9
Election of Officers, Western Association 57
Election of Officers, American Association 284
Election of Honorary Members, Western Association 39
Election of New Members, American Association 266
Electric Light at the Suez Canal 41
European Gas Association, Meetings of the. 66
Edison, T. A., Summary of a Paper by, on a Pyro-Magnetic Dynamo 136

E.—Continued.

Engines for Driving Dynamos, Regulating the Speed of 141
English Gas Companies and Mineral Oil .. 199
Electric Lighting from Central Stations ... 231
Electricity, Gas into 257
Executive Committee, Report of, American Association 264
Executive Committee, Supplementary Report from, American Association 327
Electric Light Business, the Advantages to Gas Companies of Engaging in, by E. J. King 317
Energy, the Conservation of 397

EDITORIALS—
- American Association, the Coming Meeting of the 162
- American Gas Institute, In Regard to the Proposed 33
- "Baby Process," a Sample of Gas Made by the 34
- Books Received 306
- Chicago Gas Situation, Perplexities in the 225
- Corporate Luck, The American Gas Improvement Company 130
- Correspondence, a Self-Explanatory 353
- Dayton (Ohio) City Council, Decision of the 129
- Denniston, W. H., Personal Mention of 130
- European Gas Association Meetings, the 66
- Exeter Theater Disaster 194
- Fuel Gas Question 385
- Gas Institute, Progress in the Matter of the Proposed 98
- Harrison, F. E.—Obituary 2
- Levy's Electric Light Primer 98
- New York Meeting, the American Association's 257
- Nettleton and King Papers, the 305
- Not Quite so Glittering 385
- Putnam, C. E.—Obituary Note 162
- Progress Scored in 1887 1
- Springfield, Mass., the Outcome at 65
- Warning, the Final in Regard to the American Association Meeting 226
- Welcome Home to Mr. E. Stein 194

F.

Furnishing Gas without a Holder, by J. W. Dunbar 37
*Furnaces, Humphrys' Patent Damper Frame for 105
Forbes, G., on Electric Lighting from Central Stations 231
Fuel Gas Plant in Pittsburgh, Pa 110
Flock's (Dr.) Experiments on Coal Oil Lamps 138
Furnaces, Generator, for Small Gas Works. 141
Finance Committee, Report of, American Association 266
Fuel Gas, by Emerson McMillin 311
Furnace, Half-Depth Regenerative, Development of, by Oscar Weber 324
Furnaces, Regenerative, Advantages of for Large and Small Gas Works, by F. Bredel 325
Fog, the Cost of a Day's to Londoners 386

G.

Gas Institute, Meeting of the 9
Gas for Cooking and Heating 9
Gas Furnished without a Holder, by J. W. Dunbar 37
Gasholders, What Causes the Formation of Small Holes in the Iron of 68
Gas and Artesian Wells 74
Gas Institute, British, Papers Read at the Recent Meeting of 9., 101, 131
*Gandon, Chas., on Coke 90
Gas Coke as a General Fuel, by C. E. Jones. 101
*Gas Gauges, Richard Brothers' Standard.. 105
*Gasholders, the Guide Framing of, by W. H. Y. Webber 131
Gas Light and Coke Company, the Accounts of the 138
Generator Furnaces for Small Gas Works... 141
Gas Managers, Hints to 174
Gas Companies (English) and Mineral Oil.. 199
Gas and the Stage 201
*Gas Pipes, a Handy Machine for Piercing. 232
Gas into Electricity 257
Gas, the Effect of on the Binding of Books 259
Gas Companies and the Electric Light, Advantages to of Engaging in, by E. J. King 317
Gas, Candle Power of, the Disadvantages of Fluctuations in that Supplied to Consumers, by R. J. Monks 323
Generating Steam, the Use and Value of Coke for, by J. L. Hallett 326
Gas Interest in England, Mr. R. P. Spice on the 327
*Gas Works, Structural Capacity and Cost of, by V. Wyatt 355
Gas for the Million 362
Gas Works of British Columbia 386
Gas Tar, Utilization of 392
Grand Central Railway Depot (Cincinnati, Ohio) Results of the Lighting Test at 392

H.

Humphrys, N. H., on Some Past Projects for the Manufacture of Oil Gas 29
Honorary Members, Election of, Western Association 38
*Humphry's Patent Damper Frame for Furnaces 105
*Hydraulic Main, the Alavoine Plan of as Used in the Dijon Gas Works 233
Hinman, C. W., on the Effect of Carbonic Acid on the Illuminating Power of Coal Gas 258
*Humphreys, A. C., on "Illumination vs. Candle Power 272
Half-Depth Regenerative Furnace, etc., by O. Weber 324
Hallett, J. L., on the Use and Value of Coke for Generating Steam 326

I.

*Inverse Squares, the Rule of the, by B. E. Cholar 7
Inflammable Substances, Regulating the Storage of in Washington, D. C. 41
Institute, the British Gas, Some of the Papers Read at Last Meeting of 99, 101, 131
Ironwork, Painting 142
Illuminants, Oil and Water Gas as, by C. F. Prichard 226

I.—Continued.

Illuminating Power of Coal Gas, Effect of Carbonic Acid upon the, by J. T. Sheard 227
Irish Bog Oxide of Iron on the Determination of Hydrous and Anhydrous Peroxide of Iron in 232
Illuminating Power of Coal Gas, Effect of Carbonic Acid on, by C. W. Hinman 258
*Illumination vs. Candle Power, by A. C. Humphreys 272
Intensity of Light and Visual Perception, the Relation of, by Ed. C. Jones 275
Illuminating Power of Gas, Comparative, when Purified with Lime or Oxide of Iron, by C. W. Blodget 320
Indian Petroleum Fields 333
Items of Interest from Various Localities 10, 43, 74, 105, 138, 170, 202, 234, 265, 307, 362, 394

J.

Jubilee Rejoicings 9
Jottings from Rome, Italy, by E. Schinrock 36
Jones, C. E., on Gas Coke as a General Fuel 101
Jones, Ed. C., on the Relation of Intensity of Light and Visual Perception 275

K.

Kokomo's (Ind.) Gas Well 46
King, E. J., on the Advantages of Gas Companies Engaging in the Electric Light Business 317

L.

Lungren Burner, the, by T. A. Cosgrove 68
Leakage from Gas Mains, Detection of 73
Lightning Strokes, How to Protect Tall Chimneys from 78
Levy's Electric Light Primer 98
Lectures on Coal Gas, by Lewis T. Wright. 137
Lunge, on "Coal Tar and Ammonia," a New Edition of 201
Leavenworth, Gen. E. W., Death of 306
Lighting Test at the Grand Central Railway Depot, Cincinnati, Ohio, Results of the.... 392

M.

*Machine for Screwing and Cutting Tubes.. 41
Men in the Retort House, Considering the Policy of Working Three Shifts of in 24 Hours 73
Mains, Gas, Detection of Leakage from..... 73
Manufacture of Coal Gas, an Abstract of Four Lectures, by Lewis T. Wright..... 195
Mineral Oil and the English Gas Companies 199
Motive Power, Compressed Air as a 200
Marsault's Coal Washer 205
*Machine for Piercing Gas Pipes, a Handy. 232
Morton, H., President Takes Part in the Discussion on the Humphreys' and Jones' Papers, American Association 276
Municipal Gas Works, Shall Chicago Have a? 306
McMillin, E., on Fuel Gas 311
Meter Connections, Reports of Special Committees, American Association, on a Uniform Standard of 266, 317
Monks, R. J., on Disadvantages Occasioned by Fluctuations in Candle Power of Gas Supplied to Consumers 323
Marlboro', Mass., a Line from 334
Mortar, the Effects of Freezing on Cement.. 390
Market for Gas Securities, the 14, 45, 78, 110, 142, 174, 206, 238, 285, 334, 366, 398

N.

Natural Gas, How to Enrich 69
Nettleton, C. H., on the Utilization of Residual Products 279
Noble, A., on the Effects of Freezing on Cement Mortar 390
Notes from the West, by Retort 10, 42, 110, 130, 365

O.

Oil Gas, a Glance at Some Past Projects for the Manufacture of, by N. H. Humphrys. 29
Oxide of Iron, Purification of *in situ* 73
Ohren, M., and the Sulphur Compounds 137
Oil Lamps, Dr. Flock's Experiments on 138
Oil and Water Gas as Illuminants, by C. F. Prichard 226
Oxide of Iron, Irish Bog, on the Determination of Hydrous and Anhydrous Peroxide of Iron in 232
Oil Lamps, the Dangers of 232
*Oxide of Iron vs. Lime, Comparative Illuminating Power of Gas Purified by, C. W. Blodget 320
Oxide of Iron, Valuation of in the Purification of Gas 331

OFFICIAL NOTICES, ETC—
- American Gas Light Association 97, 161, 193, 225

OFFICIAL REPORTS—
- American Gas Light Association, XV. Annual Meeting of 263, 311
- Western Gas Association, X. Annual Meeting of (Concluded from Vol. XLVI.) 2, 34, 66

P.

Plants and the Electric Light 2
Purification of Oxide of Iron *in situ* 73
Papers Read at the Meeting of British Gas Institute 99, 101, 131
Pyro-Magnetic Dynamo, Summary of a Paper, by T. A. Edison 136
Pittsburgh, Pa., Fuel Gas Plant in 110
Painting Ironwork 142
Putnam, Chas. E., Obituary Note 162
Purification in Closed Vessels, by Wm. Young 163
Preservation of Railroad Ties and Timber by the Use of Antiseptics by J. P. Card.. 166
Peroxide of Iron in Irish Bog Ore, on the Determination of 232
Place for Next Meeting, Western Association 38
Place for Next Meeting, American Association 282
Power, Compressed Air as a Motive 200
Photometrical Standards, W. J. Dibdin on . 200
Petroleum Scare, an English 201
Prichard, C. F., on Oil and Water Gas as Illuminants 226
Petroleum in Russia 229
*Piercing Gas Pipes, a Handy Machine for. 232
President's Address, Report of Committee on, American Association 283

P.—Continued.

Printing the Papers in Advance, American Association 327
Publishing the Proceedings, American Association 328
Purification Puzzles, by Thos. Turner 321
Page, G. S., on the Market for Residual Products 282
Petroleum Fields of India 333
Purification *in situ* 361
Plainfield (N. J.) Public Lighting 386

Q.

Question-Box, Western Association 2, 66

R.

*Rule of the Inverse Squares, by B. E. Cholar 7
Rome, Italy, Jottings from, by E. Schinrock 36
Regulating the Storage of Inflammable Substances, Dist. of Columbia 41
Russia, Coke in 78
Refrigerating apparatus, Tests of 104
*Richard Brothers' Standard Gas Gauges .. 106
Remarkable Accident 137
Regulating the Speed of Engines for Driving Dynamos 141
Railroad Ties and Timber, the Preservation of by Antiseptics 166
Regenerative Retort Firing System for Small Gas Works, by T. Blythe 168
Russian Petroleum 229
Roll Call, American Association 263
Residual Products, Utilization of, by C. H. Nettleton 279
Regenerative Furnace, Development of the Half-Depth, and Some of the Results, by O. Weber 324
Regenerative Furnaces, the Advantages of for Large and Small Gas Works, by F. Bredel 324
*Regenerator Tar Furnace, by J. Somerville 387
Railroad Cars, How Shall They be Heated?. 391
Results of the Lighting Test at the Grand Central Railway Depot, Cincinnati, Ohio. 392

S.

Spectroscopical Test of Tar Colors 8
Slag, Cement from Blast Furnace 13
Spencer, R., Letter from to Western Association 39
Schinrock, E., Jottings from Rome, Italy... 38
*Screwing and Tube Cutting Machine..... 41
Suez Canal, the Electric Light at the..... 41
Société Technique de l'Industrie du Gaz en France 74
Sulphate of Ammonia, Production of in England 74
*Standard Gas Gauges, Richard Brothers'.. 106
Short Belts for Driving Dynamos 109
Speed of Engines for Driving Dynamos, Regulating the 141
*Standard Ammeter, the Waterhouse..... 199
Sheard, J. T., on the Effect of Carbonic Acid, etc 227
Sutherland, J., on the Determination of Certain Ingredients of Irish Bog Oxide of Iron 232
Secretary and Treasurer, Annual Report, American Association 263
Special Committees, Appointment of, American Association 269
Steam, the Use and Value of Coke for Generating, by J. L. Hallett 326
Spice, R. P., on the English Gas Business.. 327
Saccharin 332
Soldering, Difficult 332
*Shadowless Arc Light Pole, the Crompton. 334
*Structural Capacity and Cost of Gas Works, by V. Wyatt 355
Somerville, J., on a Regenerator Tar Furnace 387

T.

Tar Colors, Spectroscopical Test of 8
*Tube Cutting and Screwing Machine 41
Timber and Railroad Ties, Preservation of by Antiseptics 166
Told Briefly—Proposed Extension to the Washington (D. C.) Company's Plant.... 205
Trenching and Pipe Laying 306
Turner, Thos., on Three Purification Puzzles 321
Turning the Tables—the Results of an Expert Meter Tester's Work in Cincinnati, O. 360
Tar Useless for Gas Making 362
*Tar Furnace, a Regenerator, by J. Somerville 387
Tar from Gas, Utilization of 392

U.

*Utilization of Gas Tar 392

V.

Votes of Thanks, Western Association, 73; American Association 330
Visual Perception, the Relation of Intensity of Light and, by Ed. C. Jones 275
Vote of Sympathy by American Association to J. R. Thomas 331
Valuation of Oxide of Iron for the Purification of Gas, by H. L. Greville 331

W.

Watts, S., Resolution Offered in Regard to the Egner Institute Proposition, Western Association 6
Wells, Artesian and Gas 74
*Webber, W. H. Y., on the Guide Framing of Gasholders 131
Western Waifs, by Diaphragm 173, 238
Wright, Lewis T., Abstract of Four Lectures on the Manufacture of Coal Gas 195
*Waterhouse Standard Ammeter 199
Washer, Marsault's Coal 205
Water and Oil Gas as Illuminants, by C. F. Prichard 226
Wheeling, West Va., How Gas Works Officials are Selected at 261
Water Gas, by Walton Clark 269
Weber, O. B., on Development of the Half-Depth Regenerative Furnace, and Some of the Results 324
Wood, Distillation of 333

Y.

Young, Wm., on Purification in Closed Vessels, and Avoidance of Nuisance in Gas Manufacture 163

Z.

Zirconia, Valuable Deposits of 262